Minnesota Society of Professional Engineers

Honorable Mention of Seven Wonders of Engineering Award

Minneapolis, MN, 2002

- The new Cast-In-Place Concrete 34 MG Underground Finished Water Reservoir serves the needs of its 500,000 citizens and increases the treated water supply for Minneapolis by 30%.
- This reservoir is considered to be the Largest Concrete Structures in the U.S.A. constructed Without Expansion Joints – the potential source of leakage.
- The design performed In-House by MWW Project Engineer, Galina Izraelev, and her extensive day-by-day involvement in the construction process as a Project Manager saved the City of Minneapolis over $1 Million and prevented the change orders during construction of the concrete superstructure.
- Built-up subgrade between 2 feet and 50 feet over 6 acre site allowed the base of the new reservoir to be build at the same elevation as existing structure thus eliminating the need for a pump station and reducing operational and maintenance cost.
- Steep reinforced earth slopes increased the capacity of the reservoir by 6 MG.
- The earth construction is considered to be the Largest Reinforced Earth Project in Minnesota.

American Council of Consulting Engineers in Minnesota
Presented to Minneapolis Water Works

THE HONOR AWARD FOR ENGINEERING EXCELLENCE

34 Million Gallon Underground Finished Water Reservoir Project,
Considered to be the Largest Reinforced Earth Project in Minnesota.

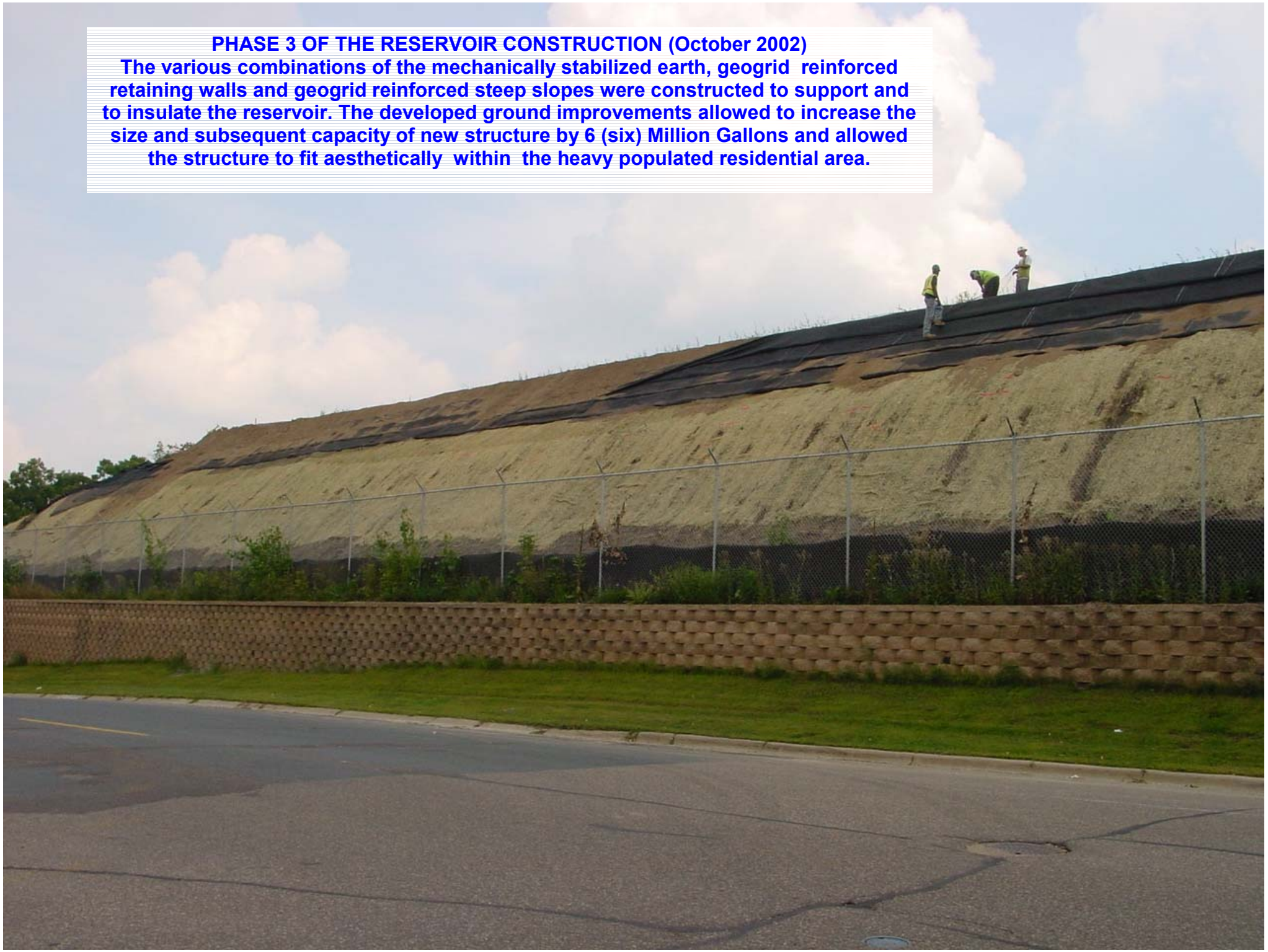
Minneapolis, MN, 2003

Minnesota Society of Professional Engineers
Presented to Minneapolis Water Works

THE HONORABLE MENTION OF SEVEN WONDERS OF ENGINEERING IN MINNESOTA AWARD

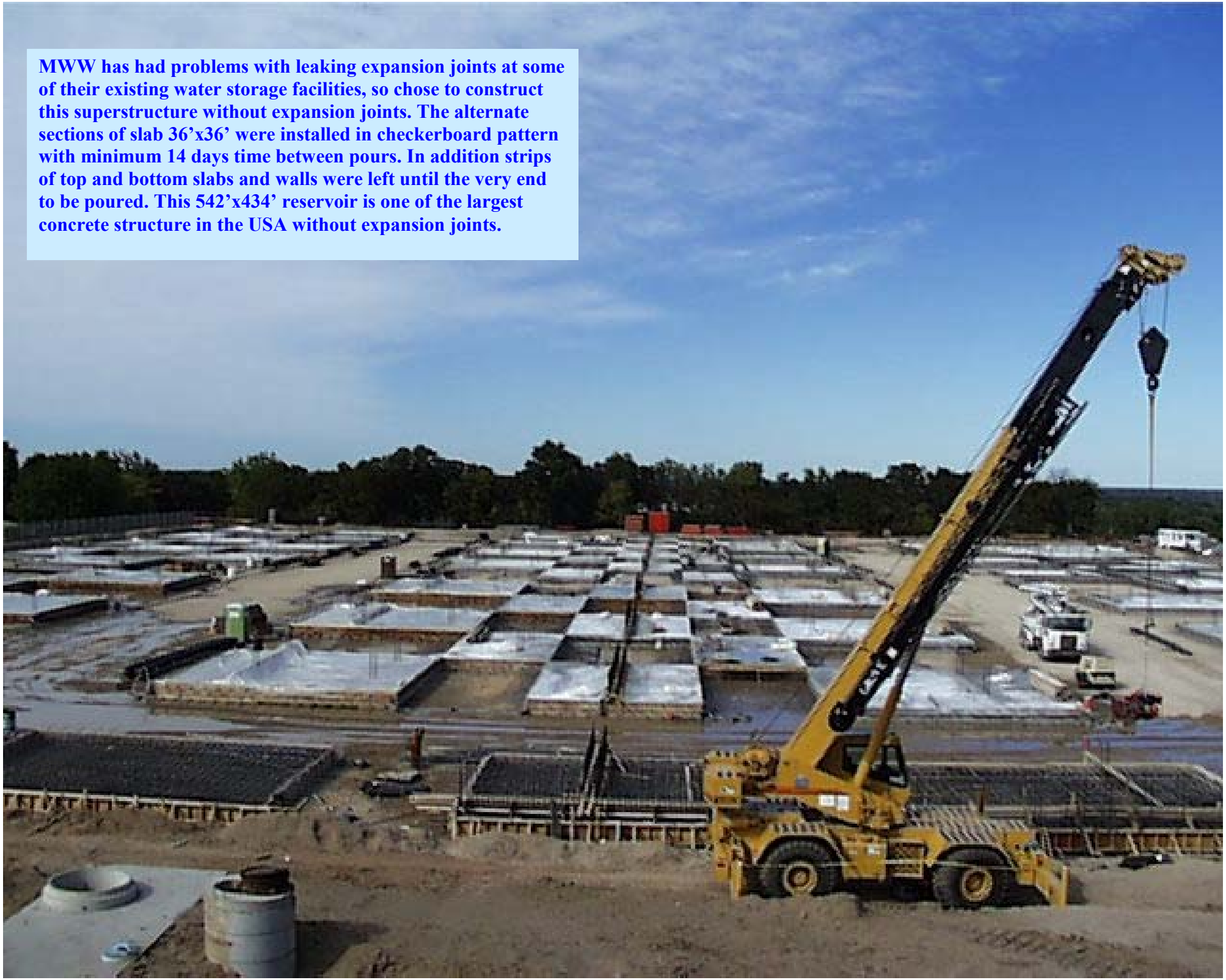
For Distinguished Engineering Achievement

Underground Finished Water Reservoir
Minneapolis, MN, 2002



PHASE 3 OF THE RESERVOIR CONSTRUCTION (October 2002)

The various combinations of the mechanically stabilized earth, geogrid reinforced retaining walls and geogrid reinforced steep slopes were constructed to support and to insulate the reservoir. The developed ground improvements allowed to increase the size and subsequent capacity of new structure by 6 (six) Million Gallons and allowed the structure to fit aesthetically within the heavy populated residential area.


MWW has had problems with leaking expansion joints at some of their existing water storage facilities, so chose to construct this superstructure without expansion joints. The alternate sections of slab 36'x36' were installed in checkerboard pattern with minimum 14 days time between pours. In addition strips of top and bottom slabs and walls were left until the very end to be poured. This 542'x434' reservoir is one of the largest concrete structure in the USA without expansion joints.

The massive cast-in-place water containing concrete reservoir (measuring 542'x434'x24'deep) required expansion joints to permit the separate segments of the structure to expand and contract in response to temperature changes during several years of construction without affecting the reservoir structural integrity and serviceability. The potential problem even in the well constructed water reservoirs has been the leakage, and the leaks most likely were to occur through expansion joints.

The reservoir was constructed with control (contraction) joints and expansion joints were eliminated without jeopardizing the structural integrity and reservoir serviceability. The contraction joints were provided at 36 feet intervals in all directions for the entire structure and exact concrete placement sequence requirements were defined for the construction. The alternate sections of bottom slab, walls and top slab no larger ten 36x36 feet have been placed in checkerboard pattern, cured for at least 14 days, and only then the remaining sections have been placed between them. In addition two strips of base slab, including columns, walls and top slab in the longer direction and one strip in the other direction were left uncompleted and were poured only after all other concrete in the entire structure, including top and bottom slabs, exterior and interior walls and columns has been poured.

PHASE 3 OF THE RESERVOIR CONSTRUCTION (2002)

Due to the confinements of the space available, the design of the reservoir called for steepened reinforced earthen slopes to support and to insulate the new underground reservoir. Slopes were built in lifts to the top of the structure, with geogrid reinforcement placed between each lift, reinforcing and stabilizing the embankment. The construction of steep slopes maximized the underground reservoir capacity by Six Million Gallons.